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# Knowledge translation in sport injury prevention research: An example in youth ice hockey in Canada

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There is critical need for scientists to incorporate a knowledge translation (KT) perspective into research plans to demonstrate the relevance of research findings and evaluate the implications for health practice and policy. Since 2011, the British Journal of Sport Medicine (BJSM) has had a focus on Implementation and Dissemination research. This field is consistent with KT, which is the term used by the Canadian Institutes of Health Research (CIHR). KT is defined as a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians.[1] As the research example in this editorial was conducted in Canada, KT terminology is used, acknowledging its similarities to Implementation and Dissemination concepts referred to elsewhere in BJSM.

Using an interdisciplinary approach, the knowledge exchange process should be one that influences health care professionals, community members, and other decision-making groups. Based on the original model developed by van Mechelen et al. (1992),[2] research in injury prevention in sport includes identification of injury burden, examination of risk factors, and development, implementation and evaluation of prevention strategies to reduce injury risk. An adaptation and extension of this model includes a focus on the prevention of injuries and their long term consequences and uses an integrated KT approach (Figure 1).[1, 3]

The Sport Injury Prevention Research Centre (SIPRC) is one of the International Olympic Committee Research Centres for the Prevention of Injury and Protection of Athlete Health. SIPRC aims to influence policy and practice through the communication of risks and context-specific prevention initiatives to reduce sport and recreational injury in youth. SIPRC has adopted a knowledge-to-action process model that follows both the definition of KT and the KT process advocated through CIHR.[1, 3] SIPRC believes that KT functions through an exchange process between researchers and key knowledge users (e.g., parents, coaches, referees, youth participants, clinicians, researchers and policy makers) in an accessible, timely, and context-relevant manner (Figure 1).

The SIPRC approach to KT practice is an adaptation of the knowledge-to-action process (Figure 2). In the knowledge inquiry and synthesis phase, identification of target knowledge users and key relationship building with groups impacted by the research findings is essential. In the knowledge exchange phase, establishing stakeholder information needs by engaging all groups invested in the planning, producing, disseminating and application of research is key. In the inquiry and synthesis phase, establishing the way in which we can build capacity in end-users to influence their decision-making is critical. Finally, as part of our iterative KT practice, establishing goals in research dissemination and considering the key messages and how they will be delivered to the broader audience is important. Active engagement of knowledge users is central in developing and executing dissemination plans. This includes a qualitative and quantitative evaluation component to determine the impact of our work.

An example of our KT approach comes from our research program in injury prevention in youth ice hockey. In brief, concussion and other significant injuries have been an increasing concern in Canada, particularly in age groups where body checking (BC) is permitted. Hockey Canada allows BC nationally starting in PeeWee (ages 11 – 12 years), but specific BC policy is determined provincially. For example, more conservative policy has been in place since 1998 in Hockey Quebec, where BC is first introduced in Bantam (ages 13 – 14 years). There was a high risk of injury and concussion in PeeWee players exposed to rules allowing BC, prompting the first prospective evaluation of BC policy differences between provinces. In a cohort study in the 2007/08 season (n=2154), we compared injury and concussion in PeeWee in Alberta versus

Quebec where we found a 3-4 fold greater risk of injury and concussion in Alberta, compared to Quebec.[4] Further, in a cohort study in the 2008/09 season, evaluation of BC experience on the risk of injury and concussion in Bantam (n=1971) demonstrated similar injury and concussion risk between Bantam players in Quebec and Alberta.[5] These findings have informed policy change in USA Hockey where nationally, BC has been delayed until Bantam.

The research proposal for these studies was developed in consultation with local, provincial and national associations (i.e., Hockey Calgary, Hockey Alberta, Hockey Quebec, and Hockey Canada) and other community stakeholders (e.g., Max Bell Foundation). Project activities were shared with these partners, who were actively engaged to ensure research relevance to the community. Stakeholders guided the research context to inform the application of our results through medical organizations, hockey associations and the media. Collaboration was reinforced through regular meetings and written and verbal updates. Barriers were identified between knowledge users and the existing best practice evidence in a collaborative process. Public forums and executive summaries were pivotal in the process of building capacity in end-users.

As results became available, we continued to engage all relevant hockey associations in the development of our dissemination plans. We shared our findings with our advisory group, partners, and hockey communities through public forums locally, nationally and internationally (e.g., Provincial Hockey Association annual meetings, Ice Hockey Summit: Action on Concussion [Mayo Clinic, Rochester, MN, 2009]). We made our results available through websites (e.g., University of Calgary, Hockey Calgary, Hockey BC, Thinkfirst), presentations to our hockey communities, and local, provincial, and national media engagements. Finally, we disseminated our findings through peer-reviewed publications[4, 5] and presentations at national and international sport injury conferences.

The success of KT practice is ideally evaluated through several strategies using both qualitative and quantitative indicators. For example, we have used online surveys to elicit feedback from study participants (e.g., players, parents, coaches) to ascertain their satisfaction with the research process and to estimate knowledge and behavior changes in the sport community following our studies. The impact of research findings and success in building research capacity can also be assessed through future collaborative opportunities, high impact academic and non-academic publications, website activity, invitations to share findings with related networks, and invitations to speak at public forums, and academic and non-academic conferences.

This KT experience in youth ice hockey is one example of the strategies utilized to maximize research impact on injury risk reduction in child and adolescent sport. Collaboration between researchers, clinicians, trainees and community stakeholders is key to maximizing the public health impact of research in injury prevention in youth sport.

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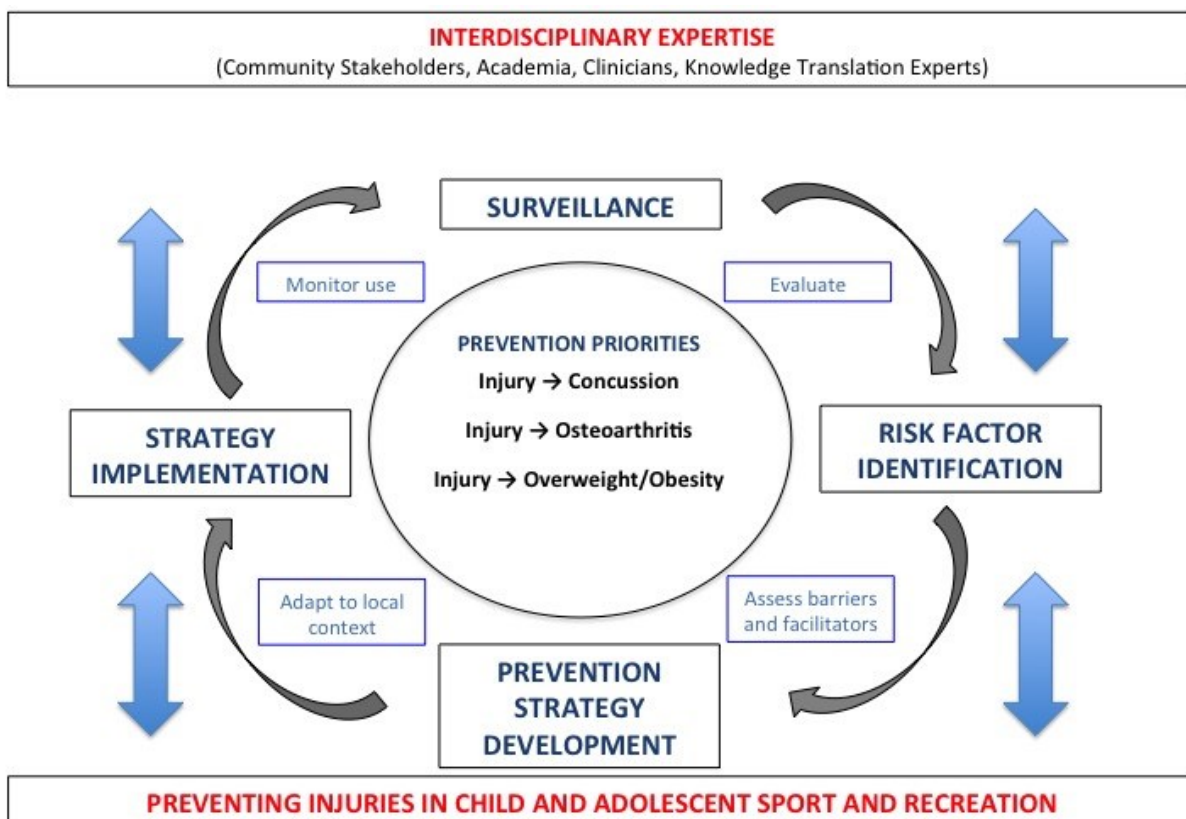


Figure 1. Sport Injury Prevention Research Centre adapted integrated KT model. The prevention of injuries and their long term consequences.